the Oyapok, the second river of the colony, the basin of which was comparatively unknown. On August 21 Dr. Crevaux was at the mouth of the river. Crossing a second time the Tumuc-Humac range, which separates the waters of the Oyapok and Maroni from those of the Amazon, he descended the Kou, an affluent of the Yari, the course of which was unknown. Arrived at the Yari, which on a former occasion he had ascended only as far as Yacouman, he followed its course to its sources, which he reached on October 24 last, after a journey of about 170 miles on that river. On that date he wrote a note in pencil to Paris, announcing the result of that part of his journey, but predicting for the remainder of his exploration considerable difficulties, which, however, he has succeeded in surmounting. A short letter just received by *La Nature* intimates the return of Dr. Crevaux to Sainte Marie de Belem on January 9 last, and contains a topographical sketch of the region explored. After having crossed the secondary chain which separates on the west the Yari from the Parou, another almost unknown affluent of the Amazon, Dr. Crevaux completely explored this considerable watercourse, and afterwards, descending the river, he re-explored the lower course of the Yari.

A TELEGRAM addressed by Gordon Pasha from Abujerad, on the White Nile, to the president of the Italian Geographical Society, announces that Signor Matteucci, the leader of the Italian scientific expedition, having received permission to enter Abyssinia, had started from Adowa and landed at Massowah.

THE French traveller, M. le Comte de Semellé, arrived at Fernando Po on February 13 from the Upper Niger and Binué. He started on his expedition in May of last year, and had been engaged in pursuing his researches up to the time he returned to Fernando Po. He has forwarded to England and France an account of some of his discoveries.

THERE seems every likelihood that an attempt will be made to train African elephants as bearers of burdens, and indeed it is stated that an association has been formed for the opening up of African trade by this means. This seems to us a much more sensible and practicable plan than the construction of a railway, which has been so prematurely proposed in some quarters. With the aid at first of Indian trainers we see no reason why the African elephant should not be made as useful as his Indian brother.

THE intended laying of a telegraphic line from Aden to Zanzibar, and from Zanzibar to Port Natal *viâ* Mozambique and Delagoa Bay has promoted a project for connecting the Mascarene Islands either with Zanzibar by the Comoros or with Delagoa Bay through Madagascar by a special line. It is said that the general council of Reunion will take the lead. The aggregate population of the Mauritius and Reunion is more than half a million, and the trade of these two islands with Europe reaches annually a large sum. The density of population is very great.

MGR. LAVIGERIE, Archbishop of Algiers, has informed *Les Missions Catholiques* that it is in contemplation to increase the staff of the French Algerian Missionary expedition in Central Africa to ten priests, one of whom is to found a depot in the neighbourhood of Zanzibar for the missions of the interior.

WE gather from the *Colonies and India* that some interesting papers have appeared in the Ceylon press relative to the suitability of that island for the growth of Australian trees. The blue gum-tree does not seem to flourish under an elevation of 3,000 feet. The *Casuarina* grows freely even by the seashore. The *Grevillea robusta*, one of the most beautiful and most useful of Australian trees, had thriven well in Colombo itself, though it will not stand the full force of the sea breezes.

THE steam traffic in the Indian Archipelago has so largely increased since the opening of the Suez Canal that the roads of Batavia are found insufficient for the accommodation of the vessels, and the Netherlands Government have accordingly found it necessary to undertake the construction of a new port. This, we learn from the Manila papers, is situated in Cape Tanjong Priok, to the east of Batavia, and is to have communication with that city by means of a canal and a railway. The work of construction was commenced in 1877, and 3,000 men are at present employed on it. The new port, which is to be named after Prince Henry, will, it is expected, be finished in 1885.

THE last number of *Le Globe* contains the first instalment of a sketch by M. Veniukof of geographical discoveries in Asiatic Russia, translated by M. Metchnikof.

THE French Alpine Club has organised a tour for school boys for the Easter holidays. The excursionists will travel on foot in the two departments of Loiret and Loir et Cher, visiting Orleans forest, the banks of the Loire, Chambord Castle, and the forest of Fontainebleau, where the last frosty weather produced such extraordinary disorders. The regulations will be sent on request to the Secretaire-General of the Alpine Club, 31, rue Bonaparte, Paris. No limit of nationality is imposed. The excursion will last for seven days and be conducted by a staff of competent teachers.

A SPECIAL congress on the means of creating an interoceanic canal across the Darien Isthmus will be opened shortly by the Society of Commercial Geography of Paris.

BY a census taken in December last it appears that the population of Japan now numbers 34,338,304 souls. Yedo, which at one time had the reputation of being the most populous city in the world, contains 1,036,771 inhabitants and 236,961 houses.

NOTES

THE Copernican Society at Thorn has resolved to begin an international collection of funds for the erection of an observatory in that town, as a lasting monument to the great reformer of astronomy.

M. BAILLAUD, Professor of Astronomy to the Faculty of Sciences of Toulouse, has been appointed director for five years of the observatory of that city.

THE anniversary meeting of the Chemical Society was held on Monday, Dr. Gladstone, F.R.S., president, in the chair. The President presented his Annual Report on the state of the Society, which he characterised as affording ground for congratulation, the past year having been one of quiet prosperity. The Society numbers now over 1,000 members. Sixty-eight papers have been read and two lectures delivered by H. C. Sorby and S. H. Vines; the Faraday Lecture was delivered by Prof. Wurtz. The improved condition of the Society's library and journal was touched upon. In conclusion, the President urged the Fellows not to rest satisfied with the present attainments of the Society, but to promote research, and especially a general scientific culture in the workers, a culture which should promote largeness of view and prevent each investigator looking on his own subject as one of prime importance, to the exclusion of all others. The Report of the Research Fund Committee was then read, with a brief account of the investigations carried on in connection with the fund. After the customary vote of thanks to the officers, council, &c., the following officers and council were elected for the ensuing year:—President—Warren De La Rue, F.R.S. Vice-presidents—F. A. Abel, C.B., Sir B. C. Brodie, E. Frankland,

J. H. Gladstone, A. W. Hofmann, W. Odling, Lyon Playfair, A. W. Williamson, F. Field, J. H. Gilbert, N. S. Maskelyne, H. E. Roscoe, R. Angus Smith, J. Young. Secretaries—W. H. Perkin and H. E. Armstrong. Foreign Secretary—Hugo Müller. Treasurer—W. J. Russell. Other Members of Council—M. Carteighe, A. H. Church, W. H. Bartley, C. W. Heaton, E. Riley, W. C. Roberts, W. A. Tilden, W. Thorp, T. E. Thorpe, J. L. W. Thudichum, R. V. Tuson, R. Warington.

THE eminent algologist Dr. Rabenhorst has been compelled, in consequence of continued ill-health, to resign the editorship of the monthly cryptogamic journal *Hedwigia;* and it has now passed into the hands of Dr. G. Winter of Zürich, well known for his contributions to various departments of cryptogamic literature.

THE *Library Bulletin* of Harvard University is a publication much more interesting and valuable than its title would seem to imply. It is edited by the librarian, Mr. Justin Winsor, one of the greatest living authorities in all matters connected with libraries. We have before us No. 10 of the *Bulletin*, containing first of all a list of the more important accessions to the library between October 1878 and January 1879. This is a model list, and several of the entries are really elaborate essays, as that under the heading Maps, on Early Globes. The supplement to this list is devoted to articles, some of them of great scientific value. For example, under the title of "References in Analytic Geometry," we are furnished with a minute analysis of Descartes' Geometry. Prof. Goodall, under the title of "Floras of Different Countries" gives bibliographies of the Floras of Africa and America. In the supplement there is much other bibliographical material of literary and artistic value, each subject being continued in the supplements of successive *Bulletins*, until completed. Mr. Winsor intimates that he is preparing a list of all editions of Ptolemy's Geography, and desires detailed information of any editions that may be in foreign libraries. Altogether this *Bulletin* is one of the most valuable bibliographical publications we know of.

THE death is announced of Prof. Karmarsch, the well-known technologist. He was born in 1803. In 1823, when he was twenty years of age, appeared his first work, and his labours ended in 1872 with the publication of his greatly-valued "History of Technology." He was long director of the Hanover Polytechnic School, which was founded under his superintendence. He retired from active life in 1875.

THE French Minister of Public Works has given the required authorisation to M. Gaston Tissandier to establish Giffard's balloon in the Cours des Tuileries, and the works are progressing with great activity. The ascents are to begin on the first days of May, the price is to be reduced to 10 francs, and the admission fee for spectators to 50 centimes.

THE *Daily News* New York correspondent telegraphs that Mr. Edison has exhibited the working of his incandescent light in the illumination of his laboratory and factory, with excellent results, furnishing fourteen of the new lamps each from 18 to 20 candle power, on one circuit, giving a steady white light, much superior to the carbon, and equal to double the number of gas-jets. The generator was an ordinary Gramme machine of 2½-horse power. Mr. Edison states that he can now supply light for practical domestic use at less than half the cost of gas, but is experimenting for further improvements in the lamp and economy in the generator. He has discovered a new alloy, platinum and iridium, by the use of which he increases the number of lamps per horse power at least 50 per cent.

THE April number of *Mind* contains a paper of much interest by Mr. G. Stanley Hall on Laura Bridgman, the much-written-about American girl, who at an early age was deprived of nearly all her senses but that of touch; the paper is the result of a recent visit to Laura. Prof. Bain commences a series of papers on the life and character of John Stuart Mill.

THERE is a short and interesting article in the *Sanitary Record* of March 28 on the Registrar-General's method of estimating populations. It shows that the true method is not to take the average rate of increase during any decade to ascertain the increment of the following decade. The true rate of increase is obtained by the difference between the logarithms of any two decades.

THE number of lights for electric light-houses in France is to be increased by two important constructions, one on Planier Isle, off Marseilles, and the other at the mouth of the Gironde. There are at present in existence in France only three, one at Cape Grisnez and two at Cape La Heve, off Havre. These lighthouses are supplied with Alliance electro-magnetic engines.

THE session of the delegates of the Sociétés Savantes will be begun as usual at the Sorbonne after Easter, and M. Ferry will deliver an address on the occasion of the distribution of prizes.

A STRIKING and highly promising line of research has been recently adopted by Mr. Muybridge, of San Francisco, at the instance of Governor Stanford, viz., the instantaneous photography of animals in motion. Some of his earlier photographs of a fast-trotting horse presented attitudes wholly unexpected, and they were even thought absurd. The method latterly adopted seems to have been making the horse trot or gallop past twelve cameras, arranged in series, and by breaking threads stretched across its path, release an electric current, which effected exposure of the plates. Thus the flying steed was obtained in every position. Mr. Muybridge gave public exhibitions of what had been done. The small negatives were magnified into life size, and projected on a screen, so that every motion was visible. These exhibitions do not seem to have been appreciated by the San Franciscans. The *Scientific American*, however, and afterwards *La Nature*, have published cuts taken from the photographs, and much general interest has been awakened in these researches. Among those specially interested is Prof. Marey, who desired to be put in communication with Mr. Muybridge, as he wanted to ask his aid in solving certain physiological problems, so difficult to solve otherwise; *e.g.*, questions connected with the flight of birds. He had been dreaming of a kind of photographic gun, to seize the bird in an attitude or series of attitudes of flight. What beautiful zootropes, too, might be had! Mr. Muybridge's cartoons representing the fast gallop give a key to the breaking down of so many horses. It appears as though one fore-leg had to sustain the whole of the weight of horse and rider while the body is moved along five feet. And just before the foot is raised, a perpendicular from it would strike the back of the saddle; so that there is immense leverage, the centre of gravity being thrown so far forward of its support, and the tendons must have a terrible tension. These inquiries are being further developed by the liberality of Governor Stanford and the skill of Mr. Muybridge, and valuable results may doubtless be looked for.

AMONG recent lectures delivered at the Sorbonne was one by Prof. Marey, who has so admirably applied the graphic method in physiology. His subject was the circulation of the blood, and though (the auditory containing ladies) experiments involving the presentation of blood were naturally proscribed, he was able to give several striking demonstrations. One of these consisted in showing on an illuminated surface the phases of the heart beats of his assistant's and his own pulse, the beats being transmitted across the hall, by a thin tube, the pulsations actuating a small inscribing style placed before the electric lamp. He also exhibited a number of his ingenious apparatus illustrating the circulation, working them with water.

THE "Sixth Annual Report" of the Michigan State Board of Health is of much more than local interest. The Board seems to be a body who have a very thorough and comprehensive idea of their duty, which is very faithfully carried out by their secretary, Mr. H. B. Baker. The Report contains inquiries into all sorts of subjects connected with the sanitary condition of the people of Michigan, and many of the results obtained are of general interest. For example, with regard to earthen vessels used for domestic purposes, we are told that to the glazing material used for the inside the oxide of lead is sometimes added, making, with the alkaline silicates, borates, &c., a very fusible and closely adhering glazing. But its use is very dangerous, especially if the vessel contains acid substances, such as pickles with vinegar; the glazing decomposes, and lead salts form, which either dissolve or become mechanically suspended in the contents of the jar, and there is great danger of chronic lead-poisoning. The Report also contains some useful remarks on the various substances used to enamel iron vessels. There is also a very careful study of the climate and topography of the lower peninsula of Michigan, the meteorology of Michigan for 1877, and other information of much value.

A NEW form of water-level indicator, we learn from the Society of Arts *Journal*, has lately been designed and constructed by the India-rubber, Gutta-percha, and Telegraph Works Company, Silvertown, and has been erected by them at the Leamington New Water-Works, where it is stated to be giving every satisfaction. The reservoirs from which the supply of water is distributed to the town are situated some half-mile from the pumping-station, and it was therefore found necessary to have some kind of indicator placed at the engine-house, in order to enable the man in charge of the engines to see at a glance the exact height at which the water stood in the reservoir, so that he might be able to regulate the rate of pumping accordingly. The indicator that has been placed at the engine-houses resembles somewhat, in outward appearance an ordinary round metal case clock; the dial, instead of being divided into hours, minutes, &c., is divided into twenty equal divisions representing feet, and corresponding to the rise and fall that is required to be registered. A hand on the dial points to one of the divisions, which at any particular instant corresponds to the height at which the water in the reservoir stands. This hand, for every foot rise in the level of the water, moves an equal number of divisions round the dial; whilst, as the water falls, the hand turns back in the other direction, so that it always points to the exact height at which the water stands in the reservoir. A single line of ordinary telegraph wire communicates between the indicator and the apparatus at the reservoir. This apparatus is so constructed that at every foot rise of the water one pole of a battery is brought into connection with the line for a certain space of time, and the current from the the battery actuating the indicator at the engine-house, causes the hand to move the requisite distance round the dial. On, however, the water falling, the opposite pole of the battery is brought into connection with the line, and this is made to cause the indicator hand to move in a contrary direction. The apparatus at the reservoir is actuated by an ordinary float and weight in the water, and is arranged in such a manner that the battery contacts are always of the same duration, irrespective of the rate at which the water may be either rising or falling. A variety of uses will at once suggest themselves to which this class of electric indicator might be advantageously applied, as it can be arranged, if required, to give a diagram on paper of the water level at stated intervals of times, instead of using a hand to point to the divisions on the dial, as in the present instance; also it is evident that it can quite as readily be made to give variations in inches as in feet. As a tide indicator it might be made very serviceable on many of our large rivers, and probably ere long we shall hear of some further uses to which this novel application of electricity has been applied.

A SHOCK of earthquake was felt at Hetzdorf and Oederan, Saxony, in the night from March 12 to 13. The shock had a north-westerly direction, and a violent storm was raging at the time. At Hall, in the Tyrol, a violent shock was felt on March 13, at 11.15 P.M., in the direction from west to east.

THE *Report* of the Glasgow Industrial Museum for 1878 is satisfactory, showing as it does that the institution, under the care of Mr. Paton, is in a fair way of developing into something worthy of a city of the first commercial importance.

WE have received a copy of the Hunterian Oration delivered at the Royal College of Surgeons on February 14 last, by Prof. Humphry. It is published by Macmillan and Co.

THE Spanish *Crónica Cientifica* of March 25 contains among other interesting papers a Catalogue of the Terrestrial Testaceous Molluscs of the plain of Barcelona.

PART I. has been sent us of "A Universal Dictionary for Architects, Civil Engineers, Surveyors, Sculptors, Archæologists," &c., &c., by Mr. W. J. Christy. The London publishers are Griffith and Farran.

PROF. VIRCHOW has left Berlin for Troy in acceptance of an invitation from Dr. Schliemann.

BULLETIN NO. 1 of vol. v. of the United States Geological Survey of the Territories, contains the following papers:—Notes on the Aphididæ of the United States, with descriptions of species occurring west of the Mississippi, by Chas. V. Riley and J. Monell; The relations of the horizons of extinct vertebrata of Europe and North America, by E. D. Cope; Observations on the faunæ of the miocene tertiaries of Oregon, by E. D. Cope; Notes on the birds of Fort Sisseton, Dakota Territory, by Chas. E. McChesney, Acting Assistant Surgeon, U.S.A.; Palæontological papers, No. 9: Fossils of the Jura-Trias of South-Eastern Idaho, by C. A. White, M.D.; Jura-Trias Section of South-Eastern Idaho and Western Wyoming, by A. C. Peale, M.D.; Fossil forests of the volcanic tertiary formations of the Yellowstone National Park, by W. H. Holmes; Palæontological papers, No. 10: Conditions of preservation of invertebrate fossils, by C. A. White; Supplement to the bibliography of North American invertebrate palæontology, by C. A. White and H. Alleyne Nicholson.

DR. C. V. RILEY has reprinted in a separate form the entomological papers contributed by him to the last meeting of the American Association for the Advancement of Science. They are: "The Philosophy of the Movements of the Rocky Mountain Locust," "A New Source of Wealth to the United States," "Notes on the Life-History of the Blister Beetles and on the Structure and Development of Hornia," "On the Larval Characteristics of Corydalus and Chauliodes, and on the Development of *Corydalus cornutus*," Biological Notes on the Gall-making Pemphigmæ."

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. J. N. T. Martheze; a Globose Curassow (*Crax globicera*) from South America, presented by the Rev. Ralph Cooper; a Grey-breasted Parrakeet (*Bolborhynchus monachus*) from Paraguay, presented by Miss Maria Hilhouse; a Common Peafowl (*Pavo muticus*) from India, presented by Mr. F. B. Hopkinson; a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mr. F.

Belcher; five European Geckos (*Phyllodactylus europæus*) from Italy, presented by Prof. H. H. Giglioli, C.M.Z.S.; a Cape Ant-bear (*Orycheropus capensis*) from South Africa, purchased.

INTELLECT IN BRUTES

WE have another batch of letters on this subject, the essential points of which we shall endeavour to give in brief space:—

Mr. Wm. Hogg tells us of an incident he witnessed when calling on Mr. W. H. Michael, a gentleman well known at the parliamentary bar, who resides at Queen Anne's Gate, St. James's Park. While they were sitting in the study, the French window of which communicates with a garden at the back of the house, and had a crank latch by which it could be opened on either side, a cat presented herself outside the window, pleading for admission. She continued to plead for some time, and finding no help from within she resolved to trust to her own powers. Eying the latch, which was four feet above her, she made a spring, caught hold of the crank with her fore feet, and putting her hind feet against the other half of the window as a fulcrum she pressed open the window. This she would do several times in succession. Mr. Michael informed Mr. Hogg that the cat had never been taught to do this.

D. R. S. sends the story of a little terrier that left her puppies only once a day to be fed, gulping down hurriedly a great quantity of porridge. Returning quickly to her family she would put up all the porridge in order that she and her puppies might together enjoy a hearty meal. When the terrier was scolded for a fault it rushed away to a little distance and catching up anything it could get hold of at once—a bit of stick, a straw, a slipper or anything at hand—it would come coweringly and lay it down at our feet, with an expression of utter submission. If we were not propitiated it would run off a second time and bring another peace-offering, often in its distress catching things it would not at any other time have dared to touch.

M. W. T. writes:—A farmer, in Somersetshire, was going to a neighbouring village some three miles distant, and, not wishing to take his dog he ordered him home. The dog reluctantly obeyed. When the man arrived at a spot, about half way on his road, where the short cut he had taken across the fields joined the more circuitous road, he found the dog waiting for him. Evidently the animal had taken the longer route, which he doubtless knew, calculating on meeting his master at that point, and thus gaining his end without hindrance.

Mr. John Harmer, of Wick, Arundel, possessed a few years ago a very fine and intelligent tom-cat which was much addicted to plundering a rabbit-warren about a mile from his home. After a time it was noticed that before he proceeded on one of his expeditions "Sam" completed his toilet by wallowing in the filth turned out of the tame rabbits' hutches, he taking particular care that his neck and breast should be in as disgusting a condition as possible by smearing them up and down till both were saturated and the fur all matted together.

Mr. J. J. Cole of Mayland, Sutton, Surrey, writes:—It has been my custom to have—not a letter-box in a door in the usual way but the plate and flap in the bottom of a window sash near. I had a cat which often saw a servant go to the window on hearing the flap moved by the postman, and which, when shut out used to jump on to the window sill and rattle the flap and when the servant was seen through the glass jump down to be let in at the door. I knew a horse which during week days went round and round to the left, grinding in the cellar of a snuff maker in London. On Sundays his owner turned him out in a field at his place in the country where the horse went round and round all day long unwinding himself the other way. Why?

Mr. B. G. Jenkins describes a scene he witnessed between the large insect known as "daddy long-legs" and a small spider. The former got caught by one of its hind-legs by a pendant thread of cobweb about eight inches long, at the other end of which was the small spider. The spider cautiously descended on the thread, doubling it as he came, and secured the insect's leg more firmly. He then ascended about three inches, and drew the insect up about half an inch; but a violent resistance on the part of the latter induced him to give up the attempt. He, however, went up the thread, strengthening it as he went, and coming down again to the same place, evidently attempted once more to raise his prey, but without success, for the insect resisted so stoutly that it appeared to me to stretch the thread. The spider, Mr. Jenkins writes, saw clearly that the insect was too strong for him, that he would never be able to draw him up to the centre of his web, and that if he did not take very summary measures he would lose him altogether; so, on the principle that half a loaf is better than no bread, he set to work to secure a portion of it. The hind-leg of the insect, to which he had his web fastened, was composed of four jointed portions. Round three of these he busied himself weaving a web. Mr. Jenkins noticed particularly that he did not go up to the last jointed portion, that attached to the body. Having well secured these three, he moved up to the joint, and for a few moments appeared perfectly still. Suddenly the insect darted away, leaving three-quarters of its leg behind. What other explanation is there than that the spider disconnected it at the joint? Quietly ascending the thread, which he carried with him, and of course the leg as well, he properly placed the latter, settled down at the union of the two uppermost portions, gorged himself with juices from above and below, and then retired for the night.

Several correspondents express surprise at Mr. Henslow's position with regard to "abstract" and "practical" reasoning. They think that several of the instances adduced render that position untenable, and prove that in their degree the animals referred to showed themselves possessed of powers of "abstract" reasoning. With regard to the dog and bell story, Dr. Rae writes:—It was never intended to be understood that the dog associated the bell with "a *particular* maid," as Mr. Henslow puts it; any of the other servants would have done equally well. The dog could only show his reasoning powers by declining to ring the bell; for had he rung it, Mr. Henslow or any one else would naturally have said that the "brute" had shown no reasoning powers at all. Mr. Henslow has passed over without notice the fox and gun story, which, by his own definition, was as clearly a case of abstract reasoning as could be adduced, differing only in form of carrying into effect from what he would have recommended, which, if adopted by the fox, would have led to its destruction.

Dr. G. Frost sends the following good story:—

In answer to Mr. Henslow's request for an example of "abstract reasoning" in the lower animals (NATURE, vol. xix. p. 433), I beg to subjoin the following:—Our servants have been accustomed during the late frost to throw the crumbs remaining from the breakfast table to the birds, and I have several times noticed that our cat used to wait there in ambush in the expectation of obtaining a hearty meal from one or two of the assembled birds. Now, so far, this circumstance in itself is not an "example of abstract reasoning." But to continue: For the last few days this practice of feeding the birds has been left off. The cat, however, with an almost incredible amount of forethought, was observed by myself, together with two other members of the household, to scatter crumbs on the grass, with the obvious intention of enticing the birds. I think Mr. Henslow might now be convinced that animals also possess in an inferior degree that boasted reasoning power which is generally supposed to belong to man alone.

THE PLANE OF POLARISATION ELECTRO-MAGNETICALLY ROTATED IN A VAPOUR

IT is known that Faraday did not succeed in proving electro-magnetic rotation of the plane of polarisation of light in gases, nor have others succeeded. Considering the interest attaching to this question, Herr Kundt and Herr Röntgen lately thought to repeat the attempt with very strong currents and under the most favourable conditions. The result is that they have been able to prove the rotation, at least in the case of sulphide of carbon vapour. (Their researches have been communicated to the Munich Academy.)

Sulphide of carbon was chosen because, on the one hand, it shows a strong electro-magnetic rotation in the liquid state, and on the other, its vapour has a considerable tension, even at low temperatures. An iron tube was used for inclosure and heating of the substance; it was closed at the two ends with glass plates 1 ctm. thick, and itself inclosed in a tin-plate tube; so that steam could be led between the tubes to heat the inner tube throughout to 100°. The outer tube was surrounded by six large wire-coils, each having 400 windings of wire 3mm. thick,